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From The President's Desk

Gary Wolf

WINNIPEG CHAPTER FLIGHT INITIATIVE

It is no secret that the average pilot age is increasing, largely because younger generations cannot free up the money it takes to fly a plane. There is plenty of interest but until the kids have been put through school and the mortgage has been buried, it is difficult to justify spending for pilot training and aircraft ownership.

Last year Jill Oakes, our Manitoba Regional Director, organized some seven hundred women to take their first aircraft flights. Next step was to get many of them through ground and flight school to gain their licenses. At that point it became evident that renting was an expensive option that kept the new pilots on a tight leash, close to the home airport. The project was in danger of dying on the vine.

In many parts of the country the response would be, "I paid for my flying and you can pay for yours." Instead, what happened in Winnipeg was that Jill Oakes and her husband Rick Riewe decided to underwrite the cost of a plane for use by these new pilots. The chapter supplied hangarage and a local AME agreed to do the maintenance work. Suppliers were then solicited for donations. Chapter members were given a sign-up sheet

of the non-critical work necessary to bring the plane up to snuff, and within a short time there was a nice Cessna 150 that RAA members may use for \$20 per hour plus fuel.

It is no secret that the average pilot age is increasing, largely because younger generations cannot free up the money it takes to fly a plane. There is plenty of interest but until the kids have been put through school and the mortgage has been buried, it is difficult to justify spending for pilot training and aircraft ownership.

Is your chapter running out of new blood to keep it going? Perhaps you might consider doing something like this yourself. Thanks to Jill Oakes and

Rick Riewe, Winnipeg is in healthy shape.

PROP STRIKE REGS

CAR 605.88 is a wide ranging regulation that covers abnormal occurrences, and a prop strike is abnormal, no matter how lightly it has hit something. The wording is firm and clear: (1) No person shall conduct a take-off in an aircraft that has been subjected to any abnormal occurrence unless the aircraft has been inspected for damage in accordance with Appendix G of the Aircraft Equipment and Maintenance Standards.

The word "shall" is used repeatedly in this regulation. There is no wiggle room here. The reg requires inspection and compliance with the maintenance information supplied by the manufacturer,

In the case a prop strike with a Rotax 912-914 engine, the procedure for inspection and repair is given in their online maintenance manual. <http://www.flyrotax.com/portal-data/5/dokus/d05562.pdf>

To synopsise, Rotax requires a physical external inspection including the accessories, and that directives of the aircraft manufacturer be followed. Rotax further requires that the gearbox

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A Nanching at Delta Heritage Air Park, 2013

On the cover: Peter Whittaker's plans-built Zenith. George Gregory photo.

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HAWKE FIELD 2013

Bill Wojcik's Visit to the 18th Annual Hawke Field Barnyard Fly-in



It was not exactly ideal weather to host an RAA-sanctioned aviation event but apparently this didn't put much of a dent into any visitor's enthusiasm. While the cool north wind blowing gusts around 35 kph might have kept the light weights safely in their home hangars, the sixty plus aircraft arriving one after the other during the morning of September 8th quickly filled the parking spaces.



RAA Oshawa prez Jim Morrison at work; **below,** The low-flying Bar Stool. **Opposite:** Hannu Halminen's immaculate Waco; Airplane guys build cars too. Ross Ferguson's one-off sports car.

Hawke Field, or perhaps it is better known locally as the beautifully groomed estate of the developers Hannu and Karen Halminen, has a 3300 foot grass strip that resembles an outdoors museum of manicured sod; the popular saying "Airplanes prefer grass" couldn't have been truer. Not all came by air. The rest of the terra firma bound, including this writer, arrived at the gate to find a spit and polish Air Cadet of Oshawa's 151 Chadburn Squadron welcoming and offering entry details.

Unable to resist trying his mettle, I quipped "I would have thought you would be out here with coffee in hand on this cool day for the drive-ins".

"Sir, sorry Sir, coffee can be found inside the gate Sir".

Ah, this is the kind of discipline, pride and tact that would make any father proud of his son.



Yes, memories came flooding back from my years involved in my local Air Cadet Squadron near my hometown of Stoney Creek Ontario. It doesn't matter where in Canada we live, these young men and women are training to be our future leaders, and in the case of this young man, he was a testimonial to the efforts and leadership of the squadron's C.O., Major Dale Bliss.

Every fly-in we become part of isn't just about airplanes. Oh sure, we drool

over something that someone else is proudly showing off or has just completed, and maybe even has been part of the landscape several times before, but its so much more than this. It's the people - the people who are front and centre or in most cases, behind the scenes.

And there are a lot of them. Let's just take a sample and once again, these folk really represent others like them across our great nation and within this aviation related community.

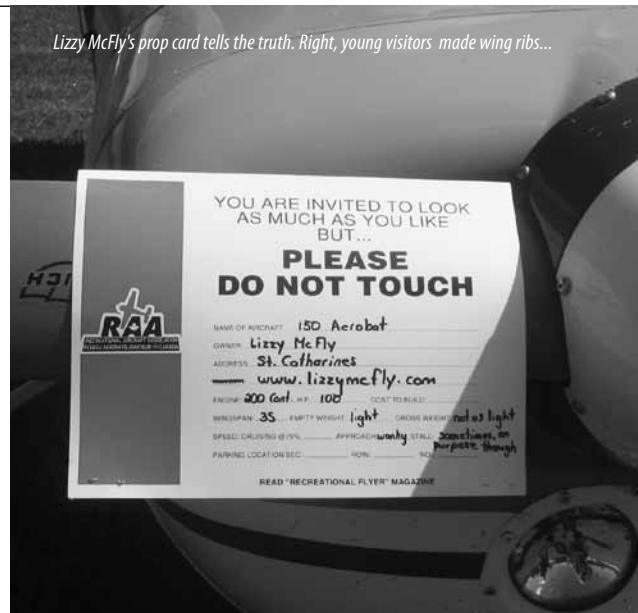
On the public address microphone was Wayne Ellis, the point man within the event's gate, who directed the visitors' further enjoyment of things to do and see.

Looking down the flight line, the nearest and very cool headed but frantic paddle waver was field marshal Guy LaMarche. Guy's "job," or perhaps a labour of love would be a better description, was part of a three man team that kept aircraft separated on the ground, wandering people off the flightline and the arrivals expedited to their parking spots.

Up in the "tower" or scaffolding that elevated RAA Oshawa chapter president Jim Morrison about 8 feet higher than the sod apron below was his communications "office".

As the radio crackled so did Jim. Wind speed, direction and the usual helpful advice was offered, while limiting much movement walking around to keep warm. A tad chilly eh Jim?

One area every person seeks out (aside from the porta potties conveniently but tastefully located elsewhere on the grounds) was the Bowmanville Kinsmen Club's beverage and food tables. Oh yes, the usual fare of BBQ



staples - hamburgers, hotdogs, and so on for a very reasonable price. Fresh corn on the cob was available free along with all the condiments necessary to add to waistlines, only a minor indiscretion from our diets...

Some things look strangely out of place and here at Hawke Field I found one -actually, it found me. Fact of the matter, it flew by me, at very low altitude so close I could count the eyebrow hairs on the pilot. It was one of those newfangled electric jobs - you know, save the whales and help the environment stay clean.

I write about an electric barstool.

Alright, so it's not an airplane, but being on the field qualifies it for transportation if you carried it in a plane to deploy after arriving.

Think of a folding bicycle, and now picture this machine with its Go Kart wheels, a shiny green frame, polished chrome bar stool and a really cool chain drive from an electric battery powered motor. What's not to like?

By the time I managed to work my way through the spectators to interview the pilot, the opportunity unfortunately was missed. Maybe next year. It looked like something that Tim Allen from "Home "Improvement" would gush

over with a souped up V8.

Since fly-ins are often held for several years running, its not uncommon to find friends, acquaintances and other pilots who often show up during the day. Whether they spend an hour or a day, touching base with them, it is always a pleasure.

Two years ago I had good fortune to meet Brian Buckley. Now, Brian is well known around the Oshawa area, and if you dig enough you'll find he is prolific at regularly flying either his ultralight twin engine Lazair or the well used homebuilt 297 pound Teenie Two.

Originally built in 1996 by Brian on a very restricted budget, he has produced an airplane few would openly admire. As one other tire kicker remarked "It must be a derelict, sitting here so long". The paint is weathered, as it should be -it is latex house paint applied with a roller and brush.

The floor panels are showing signs of heel induced cracking. Engine steel parts are rusty including the aviation REL37b plugs. Parts came from machines worth considerably more, and their owners would raise an eyebrow at their re-use to eke just a few more hours of operation.

The two stock VW engines that were

sourced to build one working 1600cc came from scrap dealer for 50 dollars. Add in the mag and prop flange, and this brings the total to \$90.

With another \$1800 for aluminum sheet, \$33 for wheels and some creative hacking of an old propane tank for steel made parts, one can quickly see C- IFTB isn't going to win any awards for elegance and design. But it flies and that is wât this is all about. Brian is one of many on the Yahoo forum group for Teenie Two builders and flyers. He is



... while the less young looked at aircraft



one of only a handful who can honestly talk the talk and walk the walk.

However not to be an idle builder, Brian is building a new Teenie on his kitchen floor. He has a very understanding wife and supportive family.

Seen a rubber chicken lately? You know, the kind hanging from a strut on an aerobatic Cessna A150L? Come on, you must have seen that orange with white and black trim airplane with those spiffy wheel pants sitting with an RAA prop card in the morning sun.

Meet "Lizzy McFly" and her bird "Vyctor". Wandering around the lines of parked airplanes, talking with those who especially were intrigued by certain features (or lack thereof) seemed to find themselves at the spinner of C - GLYZ for more than a few minutes. It's the little things that mean a lot, and the eye catchers Lizzy (aka Elizabeth Murphy) attached to her machine found their mark.

The aircraft really isn't that different from most, but presentation

is everything and the person is the package.

The RAA-supplied prop card was dutifully annotated by Elizabeth with gems like -

Empty Weight : Light

Gross Weight : Not so light

Approach: Wonky

and my favourite;

Stall: Sometimes, on purpose though.

Not surprisingly, she does aerobatics and after reading her blog online, suggests her mastery of the air maneuvers is second nature, only championed by her smile. I just had to meet this person.

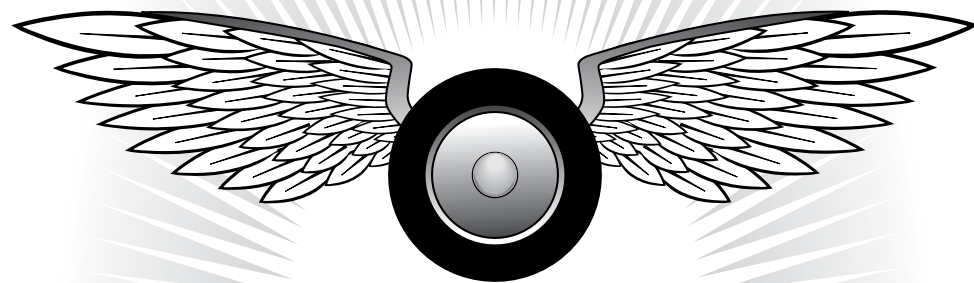
I found Ms Murphy radiating the warmth I had suspected would be found. Her personality coupled with her ability didn't even give me a clue that she endured the day to day challenges of Multiple Sclerosis. Here is one of those can-do people, not the more common Oh-I-can't kind.

I urge the reader who has the computer skills to read her blog and explore her web page at www.lizzymcfly.com.

You will as I did navigate to her flying adventures found throughout the text and myriad of pictures, and the journey is well worth it. Her energy never appears to lessen, as outside of sport aviation her other volunteer activities would drain people like you and me.

The day was getting long, the drive home was still a good two hours, and my fellow long time pilot and friend John Donaldson was like myself ready to call it a day. Many airborne as well as road warrior types were leaving or had left, so we had one last visit to those obscure but welcome relief venues where old pilots with high manifold pressure need to defuel at the earliest convenience.

It is too bad that we as a group of like minded individuals who share a passion like ours are not able because of finances and time constraints to visit each and every venue like the Hawke Field 2013 event. Maybe next year I'll be able to fly in. Fingers and mags are crossed.



A Roadable Aircraft Design Study

The idea of a street legal airplane - one that can fly and drive - is nearly as old as aviation itself. Attempts to mate the two have generally produced vehicles that aren't really that good at either.

Why is it so hard to get it right?

I'D LIKE TO PROPOSE a modest but workable first step towards a practical and affordable dual use vehicle.

In an earlier article I mentioned a few recent attempts to introduce roadable aircraft: Terrafugia's Transition, the PAL-V One roadable autogiro, I-TEC's Maverick, Sam Bousfield's Switchblade and Plane Driven's PD-2, essentially a Glastar with automotive suspension and a separate motor for driving on the streets.

The idea just won't die.

All are worthy attempts and some stand a reasonable chance of success for the lucky few that can afford them: with the exception of the Maverick they tend to be heavy and expensive, and projected prices are north of \$300K. Now for anyone who's tried to buy a new Cessna, these prices aren't that unrealistic, but they will not do much to make aviation attractive for ordinary people. And the Maverick, despite a more realistic price, is only capable of about 40 mph in the air. In its mission - bush driving with the occasional valley or river to get across - it is superb, but its lack of airspeed is a disincentive for your average sport pilot who wants to travel cross-country.

A practical roadable aircraft has the potential to revitalize grassroots aviation. It could make light aviation a practical transportation alternative while economizing on personal resources. And it would be so cool.

I'd like to look at what would make a successful dual-use vehicle

and consider the problems designers face. I want to suggest a basic design concept that I think fundamentally sound; the concept has considerable room for tweaking and I'd leave it to better minds than mine to do so. I'd like to explore a path that has been largely unexplored in the quest to design one of these hybrids.

It's no surprise that a successful

It's no surprise that a successful design has to address more than the typical sets of compromises

design has to address more than the typical set of compromises designers face. Besides the usual tradeoffs any designer faces, we're trying to combine two essentially different types of transportation into one vehicle.

Defining the mission

As usual, we must decide what we want this vehicle to do, because it will inform the rest of the design process.

The primary goal is not speed, aerobatics or massive load carrying, but safe multi-use. The two main reasons for roadable aircraft are safe VFR transportation and the economic

efficiency of maintaining and hanging/garaging (is that a word? My spell checker thinks so) a single vehicle. Easy conversion, safe operation, systems adequate to both modes, and then a good enough at both to make it worth doing.

Wings should not be stowed where they can be easily damaged and they should not be an integral part of the driving part, so they can be left behind if you're driving locally. The less exposure to road damage the better; yet they have to be easy to bring along. I really want to drive to work and go for groceries, even if I have to leave the flying part in my garage. At the same time, the wings need to be easy to cart around when you're travelling.

It should feature aircraft-like speeds, with a cruise speed reasonably faster than highway speed for a car. I'm not expecting it to be an RV-7 or a Tailwind, but it should fly at least 80 mph, and preferably more in the light sport range.

It should carry a reasonable load. For a single place vehicle, the pilot, fuel, and perhaps 20 or 30 pounds of baggage.

It needs to be able to operate out of normal airports, grass or asphalt.

It needs to convert quickly. If it takes an hour to convert from one mode to another, many of the advantages of dual use are lost. One reason people fly is because it's faster than a car, but if you hit weather and lose an hour of travelling time putting your wings away, maybe you should have



just taken the car. And a lengthy conversion time suggests lots of details you could miss - not an attractive scenario when you're going to stake your life on those wings the next time you commit aviation.

In the interest of saving weight, it needs a single engine used for both modes. And finally, it needs a ballistic parachute. Failsafes must be designed into the aircraft, but in a situation where the wings are deployed and stowed repeatedly it just seems common sense.

The Problem

The biggest headache is the centre of gravity issue, and this more than any other single reason is why so many roadables fail to impress. Airplanes need to be light on the nose wheel so the elevator can be kept a reasonable size. If I took the wings off a Cessna so I could drive it down the road, I've only got about two hundred pounds up front on the only directional control I have. As I barrel down the freeway at 60 mph and hit a pothole or encounter a gust, loss of control is likely.

Solutions are generally expensive, heavy and complex or they badly compromise the utility of the vehicle. Molt Taylor's Aerocar - arguably the most successful attempt so far - was quite complicated, and despite many ingenious features took too long to convert. But a single, integrated vehicle is going to have to put up with a light front end, complex mechanisms or use considerable aerodynamic force to keep things balanced in the air. That means excessive down-force on the elevator, with the resulting inefficiencies.

Make it a kit: affordability must be a primary design consideration.

With the ability to buy the wing off the shelf, the builder's job is drastically simplified, and the airworthiness of the wing and associated structures is already established.

For my money (if I had any) I'd go with the PAL-V One, which doesn't have the centre of gravity issues: it's what we could call a pendular aircraft: one that hangs from its lifting surface. On the ground, it tilts like a motorcycle, though it's a three-wheeler. Its only essential problem is the cost. Is there a way to get the advantages of a pendular design in a cheaper package?

I think there is.

A Solution?

Autogiros like the PAL-V One don't have the centre of gravity issues that other attempts have had, because they hang from the wing. The C of G is the same for both road and flight modes. This means considerably less complexity and weight.

I think that's the magic bullet. If we can find some other aircraft that hangs from its wing but is simpler than an autogiro, we're headed in the right direction. I-Tec's Maverick LSA falls into the same category and it doesn't just make a decent car, it's a fire-breathing hot rod. But it's slow in the air.

What about changing the wing to something faster?

Trikes are gaining popularity as sport aircraft, and could put multi-use aircraft within the reach of more pilots. They are simple, relatively inex-

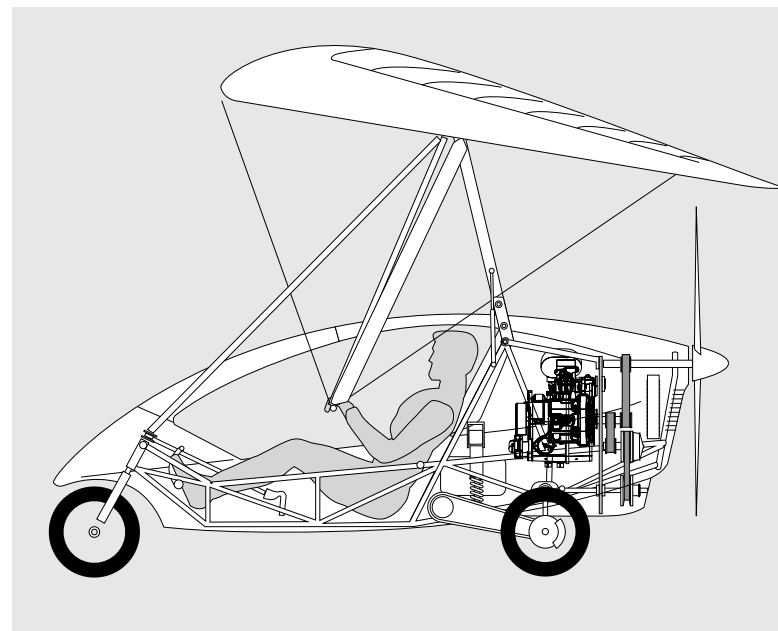
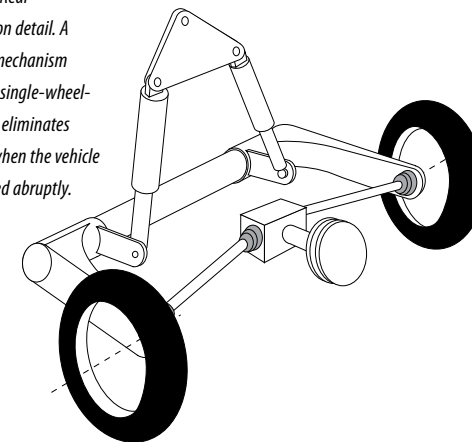


Figure 1. Rear suspension detail. A leaning mechanism makes a single-wheel-first trike eliminates tipping when the vehicle is cornered abruptly.



pensive, cheap to train on, and - like autogiros - don't have centre-of gravity issues that plague more conventional, wing-bolted-to-the-fuselage aircraft. Unlike autogiros, they are simple and cheap.

An added bonus: different wings could be attached to the undercarriage for different missions. You could have one trike portion and two or three wings: one for soaring, another for cross country, and so on. Many of these wings can be bought separately, flight tested and ready to go, though it's obviously incumbent on the designer of the bottom half to make sure it can stay attached to the wing. There's

a real efficiency here - a single airframe capable of performing different flight missions - and able to function as a roadworthy commuting vehicle.

Design Philosophy

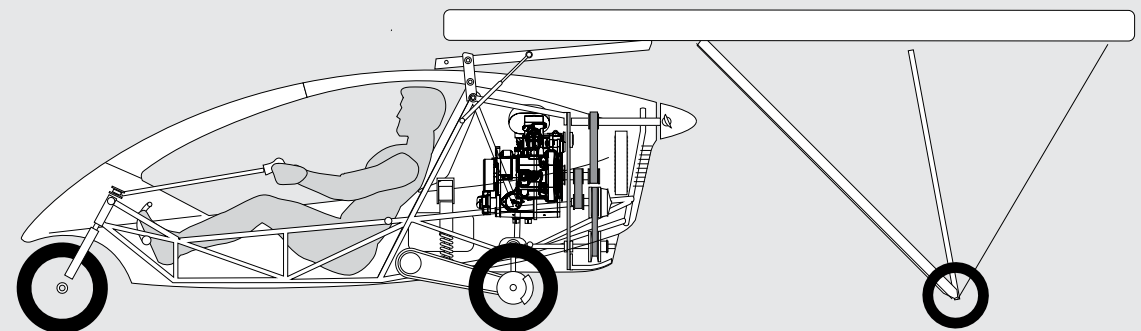
Use as much off-the-shelf technology as possible. There's no sense reinventing the wheel, even if we are reinventing the airplane. Transmissions, suspension, wing can all come from existing sources. We just want to combine them differently.

Make it a kit; affordability must be a primary design consideration. With the ability to buy the wing from established manufacturers, the builder's job is drastically simplified, and the airworthiness of the wing and associated structures is already established. The critical attach point could be sold as a premanufactured item to fasten onto the lower portion of the vehicle.

Running gear

Let's start with the bottom half. The place the people sit could have 3 or 4 wheels; for lightness, let's start with 3, the lightest minimum set of wheels for an aircraft. Although we've already got the C of G issue tamed, the absolutely optimal weight distribution suggests a delta trike would be best - one wheel in the front, and two in the back. If we want

Modern trike wings can be folded up in about 10 minutes into a package that could be easily trailered or left in the garage for extended road use.





an even amount of weight on all three wheels for driving and the hang point to be slightly forward of this point (so the nose wheel's natural position in flight is slightly higher than the back) for flying, this is the better choice. This introduces the problem, however, of abrupt turns causing a tip. There's a way around that, and we'll come to it presently.

Suspension

We need a roadworthy suspension. A light motorcycle wheel and forks for the front, and an independent rear suspension for the back. There are a couple of ways we could go here - a double wishbone type similar to what's found on some of the higher-end ATV's (the Honda Rincon comes to mind, though the parts are probably heavier than necessary) or some sort of welded-up trailing arm suspension.

Before going further, now would probably be the place to deal with the cornering issue. With the engine mounted high enough to yield decent prop clearance, we will have a high vertical centre of gravity. Throw in a single wheel in front and we're prone to tipping. However, it is possible (and has been demonstrated in a number of patents and working prototypes) to make a tilting trike, so the tipping issue more or less goes away - and more fun is had in the process. Maybe a little too much trouble to go to for ordinary road vehicles, it's perfect for something that needs to drive and fly efficiently. If we can lean into the turns, we're good, because the weight leans to the inside of the turn. The leaning feature can be locked out with a single pin or clutch device when in flight mode or stopped on the ground.

This tipping feature can be implemented several ways, depending on the style of suspension used. The trailing-arm suspension mentioned

The ability to control wing's angle of attack - the pendular aircraft's defining characteristic - can be easily actuated from an enclosed cockpit. Roll control can be initiated by aerodynamic spoilers

above would probably be the lighter and simpler way to implement this, but would require some fabrication. See Figure 1 (previous page) for more, or check out <http://www.jetrike.com/prior-art/US4887829.pdf>

Transmission

The vehicle will be light, and we want the simplest, lightest transmission as well - a Continuous Variable Transmission, (CVT) similar to those found on quads, snowmobiles (and, significantly, on the 0-60 in 3.9 seconds Maverick LSA) would fit the bill. Off-the-shelf units can be purchased from various suppliers, or even taken from an ATV.

We'll need a dog clutch on the power shaft so we can direct power either to the propeller or the wheels. The overall arrangement is based on that found on the I-TEC Maverick and has proven itself with extended, high stress ground use on and off road.

Wings

Now for the top half. Trike wings are the most obvious candidate, and some are capable of usable airspeed. And, happily, many tested and airworthy units can be bought off the shelf. Northwing's Pacer 3 wing cruises in the vicinity of 60 mph, and their GTX 5 wing (for 2 place aircraft) is another 10-20 mph faster. Other wings, like the Pegasus Quik, are good for around 100 miles per hour.

These strut-braced wings can be broken down to a towable package in about 10 minutes. The control bar and its brace wires don't need to fold; in fact, they can hold the running gear when the wing's being trailered. All that's really needed is to slide the battens out of their sleeves, fold back the leading edges along with their struts, and roll/bag the wing fabric. If you're going to be in town for a

while, leave the wing behind and just drive.

It's important to understand that what I'm considering here is a relatively crude technology demonstrator. There's lots of room to develop the concept into something with even more utility.

Future Possibilities

A trike is about as open cockpit as you can get, but I wonder if there might be ways of enclosing the cockpit. At the very least a fairing can be added to reduce the wind on the pilot and enhance the machine's esthetic appearance. But what about total enclosure?

The ability to control wing's angle of attack - the pendular aircraft's defining characteristic - could be easily actuated from an enclosed cockpit with a stick or yoke rather than the control bar normally used by trikes. All that remains is roll control. In a trike, this is normally accomplished by pushing weight into the direction the pilot wishes to go. But spoilers have been demonstrated effective. The Silent ME (an electric motorglider based on a high performance rigid hang glider wing) is a pendular aircraft with an enclosed cockpit, and it does in fact control the pitch with a control-bar like device than hangs into the cockpit through a slot in the top of the canopy. It also features a control yoke on the end that actuates the spoilers (see <http://www.technologicvehicles.com/en/details/1346/silent-glider-me-price-and-specifications> for a nice wing-mounted video of the aircraft in operation.



The beautiful Silent ME motorglider features an enclosed cockpit, pendular pitch control and roll/yaw controlled by spoilers. This layout has the potential to deliver conventional fixed-wing performance, while retaining the ideal centre of gravity for both air and road use. The small horizontal tail surface seen here is to reduce pitch sensitivity but is not otherwise an active control surface - pitch is still controlled by the manipulation of the main lifting surface.



Unfortunately the voiceover is in German, but the concept is amply demonstrated). Besides spoiling lift on the inboard wing, they create drag, helping yaw the aircraft around in the right direction. If roll is controllable in this fashion then we can dispense with the control bar entirely and attach the struts directly to the fuselage. This would allow higher speeds, and an enclosed cabin is just plain useful, making the vehicle more of an all-weather creature in either mode. It would also allow for a rigid wing, quicker to stow and trailer while allowing higher cruise speeds.

Another tantalizing possibility: what about an amphibious hull with retractable gear? A triple-use aircraft... car-aircraft-airboat? I just can't imagine anything cooler or more useful.

This needs to be done. There are fewer and fewer pilots and it is becoming less accessible for the ordinary enthusiast. If we can make aircraft something more than an expensive toy, we could revitalize light aviation - and in turn preserve our freedom to fly. ♣

George Gregory is the RAA's resident roadable aircraft nut, having caught the bug nearly 20 years ago. He holds private, commercial and Instructor III ratings, and is also the Recreational Flyer's Art Director. This puts him in the enviable position of being able to spout off about flying cars whenever space allows.





Learn Your Lessons Well

Amateur Built Aircraft Best Practices / Kevin Maher

I AM FORTUNATE to have a large well equipped hangar at our local airport. Since the Stearman project currently only takes up a portion of the hangar, I try and make it available to locals that need to do maintenance work on their aircraft. For some reason that I haven't yet figured out, I often seem to end up attached to many of these maintenance projects. During the last several years, six ama-

teur built aircraft owners have conducted their annual inspections in my hangar. It was with some alarm that I realized that of the six aircraft, only one did not have serious safety related airworthiness issues. Almost all of these issues were related to the integrity of the firewall or fire resistance of components in the engine compartment, hardware issues, and components of questionable reliability.

In the following article I will discuss the all too surprisingly common issues that these five aircraft had. If you are building, hopefully you will avoid these pitfalls. If you are an owner, they may be worth a second look at your next annual.

Firewalls

The purpose of the firewall is to prevent flames, heat, and noxious fumes from entering the flight compartment long enough to allow the pilot to shut off the fuel supply and for the fire to extinguish. Realistically this means that the firewall must be pretty much airtight and able to withstand 1500 deg. F for 45 seconds. The problem is that this is really tough to do, especially with all the wires, controls, and fluid lines that pass through the firewall. It is possible to achieve but it is difficult, and adds a little to the cost of the airplane. All too often, all this stuff just gets passed through a rubber grommet with perhaps a smush of silicone around it. (Fig.1) It doesn't take much imagination to realize that if 1500 degrees (think a plumbers torch) were applied to the area, the grommet, wire insulation, and even an aluminum fuel line would quickly melt. The correct way is to use steel bulkhead fittings for fluid lines and electrical through fittings for wires (Figs. 2,3 & 4). Push pull cables are easily routed through pass thru fittings available from Aircraft Spruce. (Fig. 5) Push rods are considerably more difficult to seal due to the range of motion. Zenair type throttle and nose wheel steering pushrods are the most difficult of all due to the large arcs that their range of motion imparts. The best answer in all cases is boots, either commercially obtained or sewn from fire blanket material (high temperature silicone impregnated fiberglass cloth). They are most easily affixed under slotted stainless steel cover plates (Figs. 6 and 7). Lastly, on a fabric or composite airplane, there is little point in building a super fireproof firewall if a fire can lick around the edge of the firewall and burn into the structure, fuselage fuel tanks, and your new shoes. In these cases there should be a sheet metal outer covering for the first few feet of the fuselage, much like the boot

Figure 1



Figure 2



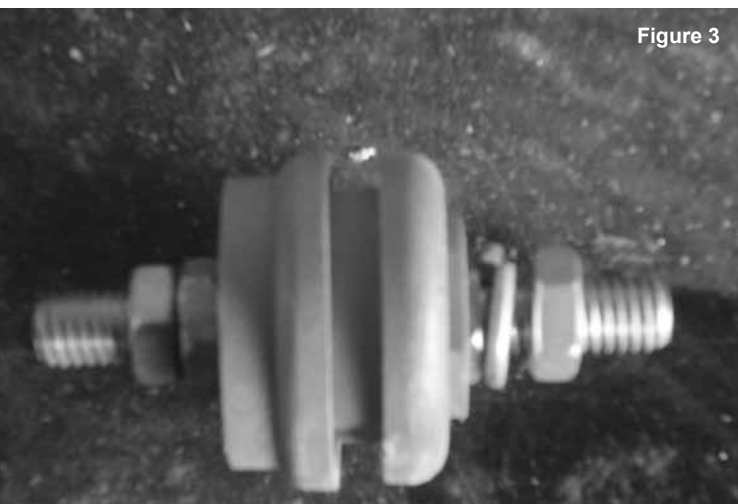


Figure 3



Figure 4

cowls on the older Piper Super Cubs of yesteryear.

Preventing fuel and oil fires

The heat, vibration and fluids in an aircraft's engine compartment make it a very inhospitable place for mechanical components. And that is when everything is working well. Add an exhaust gas or oil leak for example, and only the most robust installation will survive to the next point of intended landing. For this reason you want the most rugged and durable installation that money can buy. While perfectly legal, why would anyone ever use plastic fuel lines ahead of the firewall? (See Fig. 8) It doesn't take much imagination to comprehend the consequences of a small hole in an exhaust pipe near a line like this. Recently, a local homebuilt suffered an engine failure after an unprotected nylon oil pressure line melted due

The heat, vibration and fluids in an aircraft's engine compartment make it a very inhospitable place for mechanical components. And *that* is when everything is working well!

to exposure to high undercowl temperatures. (See Fig.9) Even standard aluminum lines are easily melted in the presence of a fire. For rigid lines I like to use soft stainless steel hydraulic tubing with an outer firesleeve covering. Flexible lines are best made from stainless braid covered Teflon hose and also firesleeved. Apart from being extremely fire resistant, these lines carry no calendar life limits like rubber based hoses, and can tolerate any type of fuel or fuel additive. An added bonus is that the reusable ends can be quickly and easily installed with no special tools. (Fig.10)

Fig.11 shows examples of two other tubing issues. Pipe threads are designed to be assembled with a thread sealant. Permatex 59234 thread sealant or something similar works very well, but avoid Teflon tape that can contaminate the system by introducing fragments into the fluid, or RTV silicone sealant that is not fuel resistant. Flare fittings on the other hand are to be assembled dry. When a flare fitting is tightened, any sealant applied to the threads will migrate into the lines. The carb screens on this aircraft were seriously contaminated with silicone residue.

The last issue I have noticed in fabricated rigid tubing is poor quality bends. A small kink will cause a large drop in fluid flow that will probably become apparent at the worst possible time during take-off or climb. Buy or borrow a good quality tubing bender and don't use your thumbs and a piece of pipe like the builder of the tube assembly in Fig. 12 did!

Nuts, bolts, cotter pins, and torque:

The metallurgical theory behind a bolted joint in tension, is that the tension applied to the bolt upon assembly, is greater than the tension loads that the bolt experience's in service. If this wasn't the case, the bolt would stretch and shrink continually as the loads were applied and relaxed leading to the possibility of early fatigue failure. This is one of the reasons that super high strength commercial



Figure 5



Figure 6



Figure 7

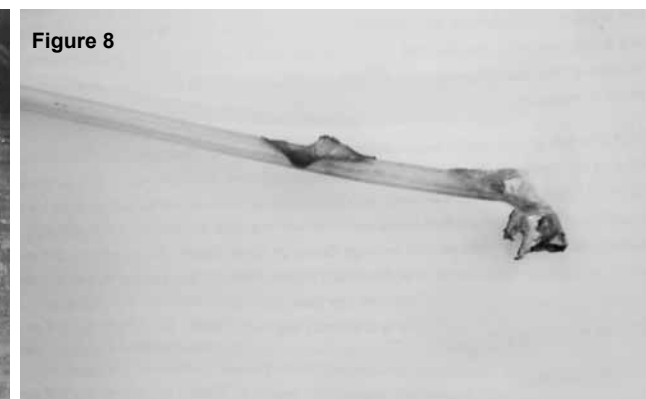


Figure 8

Figure 8 shows a plastic oil pressure line that actually melted and caused an engine failure. Don't let this happen to you!

bolts often fail – they simply were not able to be torqued to the required level, and the steel used in them is prone to brittle fatigue failure. By the way, standard AN bolts are not particularly strong, they are roughly equivalent to a Grade 5 commercial bolt. But they are fabricated from an incredibly fatigue resistant alloy – something to think about when the local airport "expert" tells you that Grade 5 hardware is just as good!

From the above, it should be obvious that under-torquing a fastener can be just as bad as over-torquing it. Unfortunately this often happens when a bolt is too long. The nut torques up against the bottom of the threads before tensioning the two components tightly together. The fastener feels tight on a wrench

but there is no tension in the bolt itself. Anytime you see more than 3 threads of an AN bolt protruding, be very suspicious of a "threadbound" fastener. I recently came across a Lycoming crankcase so assembled (See Fig.13), a fatigue failure just waiting to occur.

Another way for a fastener to become under torqued is to sandwich a soft material between the two parts being bolted together. This is most commonly seen with fireproofing materials behind firewalls such as asbestos, fiberglass, etc. If you tighten the engine mount to fuselage bolts the softer material compresses over time causing a loss of tension in the bolt. Occasionally very high strength (MS type) washers are specified. If the much softer standard

AN type washer is used, it can crush causing the same loss of torque. I once came across this issue with a Stearman's engine mount studs. The washer had crushed and the loss of torque had allowed the mount to start moving on the stud. (Fig.14) Tribal knowledge of this issue makes me believe that this engine was only a few hundred hours from parting company with the aircraft!

The last frequently encountered deficiency is the inappropriate use of self-locking nylock nuts. Prior to WWII almost all fasteners were safetied with cotter pins or lockwire. The ready availability of self-locking nuts has made a mechanic's life much easier, but there are many places where they are inappropriate. They are not to be used against



Figure 9



Figure 10



Figure 11

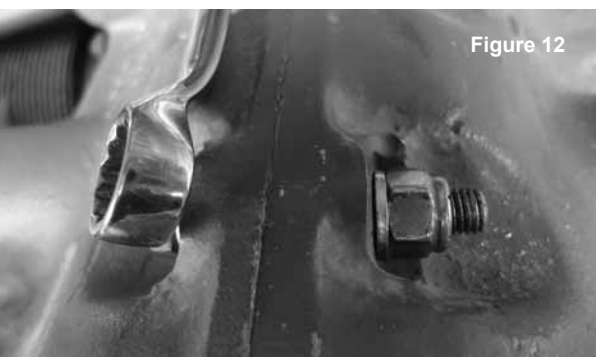



Figure 12



Figure 13, above: the stud is actually bent and the mount has a fretted stud.

rotating components, nor in high temperature applications. There is an argument that makes the case for their use in rotating assemblies that contain bearings, as the argument is that any rotation is within the bearing. This is true but what if the bearing seizes (and I have changed plenty of seized bearings)? For something as critical as a flight control, it is not worth it. It only takes an extra minute to install a cotter pin. Likewise, if you need to use a self-locking nut in the engine compartment, all metal high temperature ones are readily available. They are more expensive but there really are not that many needed in the average light aircraft. It is interesting to note that the issue of the inappropriate use of self locking nuts seems to be as prevalent in certified aircraft as it is with homebuilts.

Homebuilt aircraft are generally more capable and perform better than their production counterparts while costing far less to build and maintain.

Hopefully, paying close attention to the issues I have identified over the last several years of helping maintain amateur built aircraft will further improve our safety and enjoyment of flying. 

Kevin Maher is an expatriat member of Chapter 85 who lives and works on Vancouver Island. He is currently restoring a 1936 Stearman and is president of the Duncan Flying Club.



Some of the over 30 volunteers who evolved into the C-FLUG 'Family'. Donna Prowse (C-FLUG's Chief Pilot) is in the front row, Betty-Ann McPhedran (C-FLUG's Assistant Chief Pilot) is in the back row

Women Fly, Part 3

A donated Cessna helps the RAA reach out to women aviators / Story and Photos by Jill Oakes

LESS THAN SIX PERCENT of commercial and recreational pilots are women in 2013! In Winnipeg, local pilots, aircraft associations and businesses have taken an important step forward in making a difference. 740 women were introduced to flying in March, 30 women were offered free 5-day ground school in May, 15 women became EAA Eagles in June, 10 women have either completed or about to complete their Private Pilots Licence this Fall, and eight women have become members of the Winnipeg Area Chapter of the RAA and RAA-Canada!

In mid-September, Bill Vandenberg donated his C150, C-FLUG, to the Winnipeg Area Chapter of the RAA for women pilots to:

- build hours and stay current in an affordable manner;

- learn basic maintenance skills that aircraft owners are allowed to practise; and
- develop social connections with aviation associations.

Research indicates that these three ingredients are essential for many women pilots to thrive in the aviation community.

AFFORDABLE FLYING

To provide affordable flying, C-FLUG is available to women pilots who are current on a C152. C-FLUG is available for \$20/hour plus fuel. C-FLUG has her own identity and as a corporate COPA Member, she is insured through Magnes' Gold Wing program. Many women know their work schedules only a few days in advance, therefore the C-FLUG pilots are establishing a system



Why It's So Awesome

There are so many benefits! I will try to outline them for you:

1) The chance to feel a part of a larger mutually-interested aviation community.

2) The opportunity:

- to have a common plane to fly with other women
- to have a financially feasible way to be able to fly & stay current
- to be able to learn about the “inner-workings” of a plane under the supervision of an AME
- to get “hands-on” learning and experience about the airplane
- to take part in all the opportunities to meet other pilots and network for friendships and opportunities worldwide
- to be able to contribute to a community effort that encourages everyone to be philanthropic
- to use the plane to “pay-it-forward”
- to fly out of Lyncrest Airport with its’ friendly “homey” atmosphere
- to extend our experience from a concrete ATC aerodrome at St Andrews Airport to an uncontrolled turf home base
- to witness the joy in other pilots when they discover new information about the plane
- when they see that their donations/contributions are appreciated
- when they do something that assists another pilot to succeed
- when they are able to donate/volunteer to improve the aircraft for themselves and/or others
- But most of all, C-FLUG brought us all closer to the influence and mentoring of Jill Oakes, Donna Prowse and their team of experienced pilots. Their generosity and incredible work ethic enhance all of our lives and they are infectious! They encourage by doing – by setting the example to follow. They energize us to step-up and to help make a difference just like they do.

I feel truly blessed by these opportunities and challenges!

Betty-Ann McPhedran

Above: Bo and Donna Prowse (C-FLUG's Chief Pilot), and Betty-Ann McPhedran (C-FLUG Pilot) reassemble C-FLUG's cowl. Betty-Ann just completed her currency check out with Dana at Harv's Air. Above, Left: Picking up C-FLUG September 17th, 2013. Bill Vandenberg donated C-FLUG to the RAA with the understanding that it was for women to fly and if it was sold the funds would be given to the Winnipeg Foundation for the local 99s Scholarship Fund.

that will support those individuals, who are also often the primary care giver for children or seniors in the family. Donna Prowse (Air Canada Pilot) is C-FLUG's Chief Pilot and Check Out Pilot, Murray Bryson (Air Canada) and Frank Thomas (West Jet) are also helping as Check Out Pilots. Each of these Check Out Pilots have been incredibly generous, making themselves readily available and sharing their years of experience in a most supportive manner. Ed Ulrich has set up an online booking system for C-FLUG and has volunteered to administer the site.

PARTICIPATE IN BASIC MAINTENANCE

In order to reduce operating costs, Jill and Rick Riewe donated \$10,000 and Jim Aitken, licensed AME, volunteered to be C-FLUG's AME and spent a solid month inspecting, replacing and repairing each of C-FLUG's operating systems. Women pilots participated in the frequent ‘work parties’. Jim frequently stopped to answer questions, explain systems, and included the ‘helpers’ any chance he could. For the first time these women pilots learn by seeing a variety of parts and participating whenever feasible, including:

- the ribs and spars when the wing tips were removed for inspection;
- the engine compartment when the cowl was removed, and they learned how to reinstall it;
- inside every inspection cover;
- how every grease nipple, bearing, and hinge was lubricated and worked; and
- how to bleed the brake lines.

Goulet Aircraft Supply, Air Parts, Keystone, and ICOM, as well



as local well established pilots, RAA members, including Gary Smith (transponder), George Gavriloff (radio), Art Tendies (avionics), Bill Dawson, Bill Gibson, Victor PreFontaine, Larry Brown, Bert Elam, Steve Sadler, Derek Wrigley, Jim Goold, Adrian Meilleur, Bob Russell, Mike Gauthier, Frank Thomas, Harold Kroeker, Rick Riewe, and about 20 other helpers provided thousands of dollars of certified parts and expertise!

Above, Melody Hiebert picked up parts for C-FLUG from Goulet Aircraft Supply and helped inspect inside the wings. She is working on her ground school with Winnipeg Aviation. Left, Jim Aitken, licenced AME, volunteered to be C-FLUG's AME. **Lower left**: Amy Johnson learning how to adjust C-FLUG's seats. Amy first went flying at Lyncrest Airport with Bill Gibson (Air Canada) on an EAA Young Eagles flight; two weeks ago she earned her private pilots' licence through Harv's Air. **Below**, Marissa Selman is a C-FLUG Pilot who finished her private pilots licence with Brandon Flying Club and just completed her C152 check out with Harv's Air. She is cleaning the upholstery with Bill Vandenberg (C-FLUG donor).

SOCIAL NETWORKING

To provide an extensive social support system for C-FLUG pilots, each pilot is a member of the local and national RAA, 99s, and Springfield Flying Club. The RAA provides C-FLUG with space in our heated hangar and will provide quarterly seminars; the first will be on winter flying. C-FLUG pilots have just joined the 99s and they are already

finding the opportunity to chat with other women pilots from all over the USA really useful. In the event that C-FLUG is sold, the sale is given to the Winnipeg Foundation for the Local 99s Scholarship Fund. As members of the Springfield Flying Club, C-FLUG pilots are able to purchase fuel at discounted member prices and be

continued on page 41





OLD SCHOOL

BUILDING THE OLD-FASHIONED WAY

BY PETER WHITTAKER / PHOTOS BY GEORGE GREGORY

C-GKWI IS A SCRATCH BUILT

Zenith 601 HDS which got started in 1999 from plans purchased in 1998. I had just sold a Piper Cherokee and was looking for a means to stay involved with aviation and at the same time have an interesting building project. After consideration of other plans, the Zenith 601 HDS had the attraction of being all metal, it used construction methods that did not require specialized tooling and had the speed and range for cross country flights. My goal was to build from scratch with the exception of welded parts (fuel tanks, landing gear, engine mount) and the firewall forward components.

The first 6 to 8 months were spent studying the book of plans and reading the construction manual before deciding to take the plunge and get into the project. The goal was to spend a few evenings and parts of weekends building while leaving enough time to "get things done around the house". I used my half of our 2 car garage in Sudbury, Ontario and when it was time to assemble

wings to the fuselage, the arrangement with my wife called for me to scrape windshields and warm up her vehicle in the winter – no problem if it meant I could get extra space. The weight and balance was done in June of 2012 and the Special Certificate of Airworthiness was issued in October, 13 years from the time building began. After engine runups on the Jabiru 3300 and modifications to air flow baffles in the cooling ducts, the first test flight, one circuit, was done in April of 2013. The project effectively took 14 years from the time the first plywood and metal was cut to the first flight.

Once the decision was made to start building, the first task was to prepare a detailed materials list so that the appropriate sheets of 6061-T6 aluminum could be ordered in the required thicknesses of 0.016", 0.025", 0.032" and 0.040". Two sizes of Avex rivets (aviation equivalent to pop rivets) would be needed, A4 and A5 plus a collection AN nuts and bolts. Everything in the airplane uses Avex rivets except the

OLD SCHOOL

wing and centre section main spars. These spars are built up from 0.040" aluminum with 1/8" extruded angle and flat bar stock held together by solid rivets. A friend had bucking bars and a rivet gun so with all the layouts done, the riveting was done in one evening. I also bought an air compressor with a pneumatic rivet puller and metal shears and from previous wood working projects, I already had a 93" band saw for which I acquired metal cutting blades. This proved to be very

useful for cutting parts, particularly for some of the thicker components in 1/8" aluminum. A 4' X 8' work table was built and equipped with castors plus parallel levelling beams to allow the wings and centre section to be built with clearance underneath while being kept level. I acquired a small 2' long bending brake and for longer bends such as wing trailing edge spars, I found a local metal fabrication shop where they were intrigued with the project and would only accept a donation to their Tim

Horton coffee fund in payment.

FORMING BLOCKS The first step, before any metal was cut, involved making 3/4" plywood forming blocks. This went on for some time and made me wonder if there was more wood work to be done than metal work. The centre section and wings are each 8' long to give a total wingspan of just under 24'. The centre section has a constant chord and uses one set of forming blocks for the ribs and since multiples of these are

THE PROJECT EFFECTIVELY TOOK 14 YEARS FROM THE TIME THE FIRST PLYWOOD AND METAL WAS CUT TO THE FIRST FLIGHT.

required, one side of each block is protected by 1/8" aluminum plate. The HDS (Heavy Duty Speedwing) can also be built as the HD (Heavy Duty) model, the difference being that the HDS has a tapered wing and the HD has a constant chord wing. Having decided on the HDS wing, this meant that I needed to make different sized forming blocks for each rib and thus even more wood work. Forming blocks are also needed to make the formers for the fuselage top, rudder, elevator and stabilizer ribs.

WINGS I began building by making all ribs for both the wings and the centre section and then moved into constructing the wings first. The layout fits the 4' X 8' work table (Fig. 1) and the plans give measurements for washout blocks that are placed on the trailing edge of each wingtip to provide the required wing washout. The washout is set when the wing skins are riveted on. The wing nose skin was the trickiest part to make in terms of establishing the initial leading edge bend. This was done by building a jig out of parallel 2 X 4's on the garage floor and rounding one edge of a third 2 X 4. The flat nose skin sheet was placed on top of the parallel 2 X 4's and the rounded edge of the third was placed on top along the bend line and then gradually pushed into place between the parallel 2 X 4's just enough to initiate the bend. I quickly learned to NOT help the bend along by hand, which is a good way to crease the sheet metal. The partly bent nosekin is then placed on the wing leading edge ribs and is pulled into shape with ratcheting straps (Fig.2).

CENTRE SECTION The centre section was assembled in the same way as the wings with cutouts then being made to allow for the seat and centre armrest structure which are integral to the section (Fig. 3). The centre section also carries the torque tube for aileron and elevator control. Aileron cables run from the torque tube to bellcranks which are fitted to each



OLD SCHOOL



ZENITH 601 HDS C-GKWI

outside rib on the centre section. The bellcranks connect to their respective aileron horns by solid rods while the elevator and rudder are connected by 1/8" cable. More time and parts are involved in making the centre section and it is made from heavier sheet metal, 0.25" and 0.032" whereas the wings use 0.016" (bottom skins) and 0.025" (top skins). The centre section is further reinforced by closely spaced ribs for the walkways used for cockpit entry and with a landing gear attachment box. The main gear are part of the centre section and this facilitates removal of the wings which only requires disconnection of the aileron horn, fuel lines from the wing tanks, and electrical connections to the wingtip navigation and strobe lights. If one were so inclined, the HD model constant chord wings could be built and attached to the centre section.

FITTING WINGS AND CENTRE SECTION With both wings and the centre section completed, it was time to see if they would fit together! The aim was to see if first of all, the wings and centre section would slide together at the splice plates and then to see if the top rivet lines for each wing and the centre section would actually give a straight line. Everything came together and lined up and this was the first great hurdle done.

Wingspan:23'
Max. Gross Weight:1,200 lbs
Empty Weight:695 lbs
Engine:Jabiru 3300, 120HP
Cruise at 2,900RPM:95kts
Max cruise to date:115kts (in a dive)
Header Tank:7.5 US gallons
Wing Tanks:7.5 US gallons each
Wheels and BrakesMatco

INSTRUMENTS:

Dynon Flightdek DI80 with engine monitoring for the 6 cylinder Jabiru; EGT and CHT plus flight instruments
Garmin Aera 500 portable GPS
Garmin SL40 Com Radio
Garmin GTX 327 Transponder
Trans-Cal Industries SSDI20 altitude encoder
Power Panel – Composite Designs
ELT – Kannad 406
Standard Altimeter – Falcon Guage
Standard Airspeed – Falcon Guage

FUSELAGE The fuselage layout (Fig5.) was also done on the 4' x 8' building table and involves a box frame and flat sided sides and bottom. Extruded 1/8" L angle longerons make the top and bottom edges

and these are joined by L stiffeners and the bottom and side panels. A reinforced box assembly is built up at the back of the fuselage and this becomes the attachment structure for the rudder and stabilizer. The elevator is attached to the stabilizer using a continuous length of piano hinge and a servo was installed in the stabilizer to give electric elevator trim. Access panels were also cut into the bottom of the fuselage, and in the centre section bottom, to give access for inspections of control

cables. A rear access panel was also installed in the rear right hand side of the fuselage for the ELT.

ON WHEELS In July of 2007, the project had progressed to the point where the airplane was ready for wheels. The steel tube struts were taken to be chrome plated, mainly for corrosion resistance and were inserted into the main gear assemblies on dual bungee chords. A compression device was made to assist with stretching the bungees and

this consisted of 1/2' aluminum plates drilled for 3/8" threaded rods, nuts and washers. By tightening the nuts on the threaded rods the bungees could be stretched in order to insert the tube struts.

ENGINE A Jabiru 3300 engine was selected because it was designed as an aircraft engine with direct drive and air cooled. This meant a simple engine that I could understand plus it had a low total weight which included exhaust and oil and came

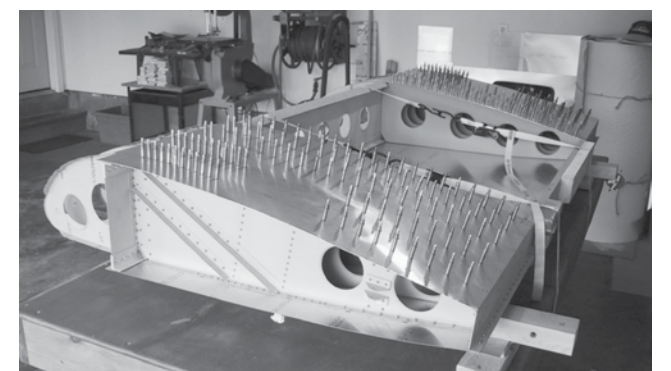
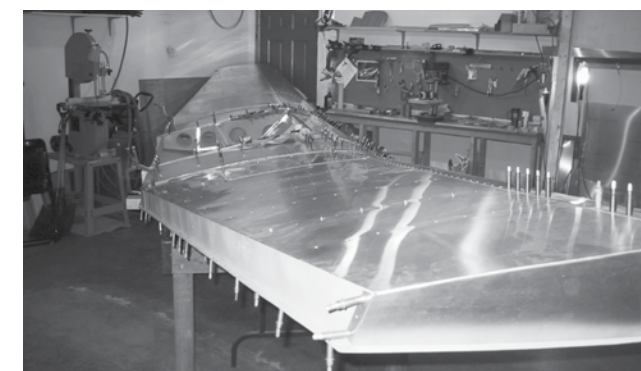
Clockwise from upper left: Initial wing set up with ribs attached to the spar. One surface of each wing, and all other airframe parts were left unriveted, clecoes only, to enable the pre-cover inspection. Once the wings were completed they were stored on a wheeled frame so that they could be moved around as needed.

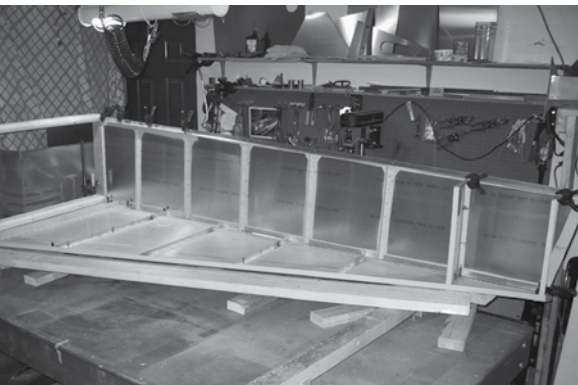
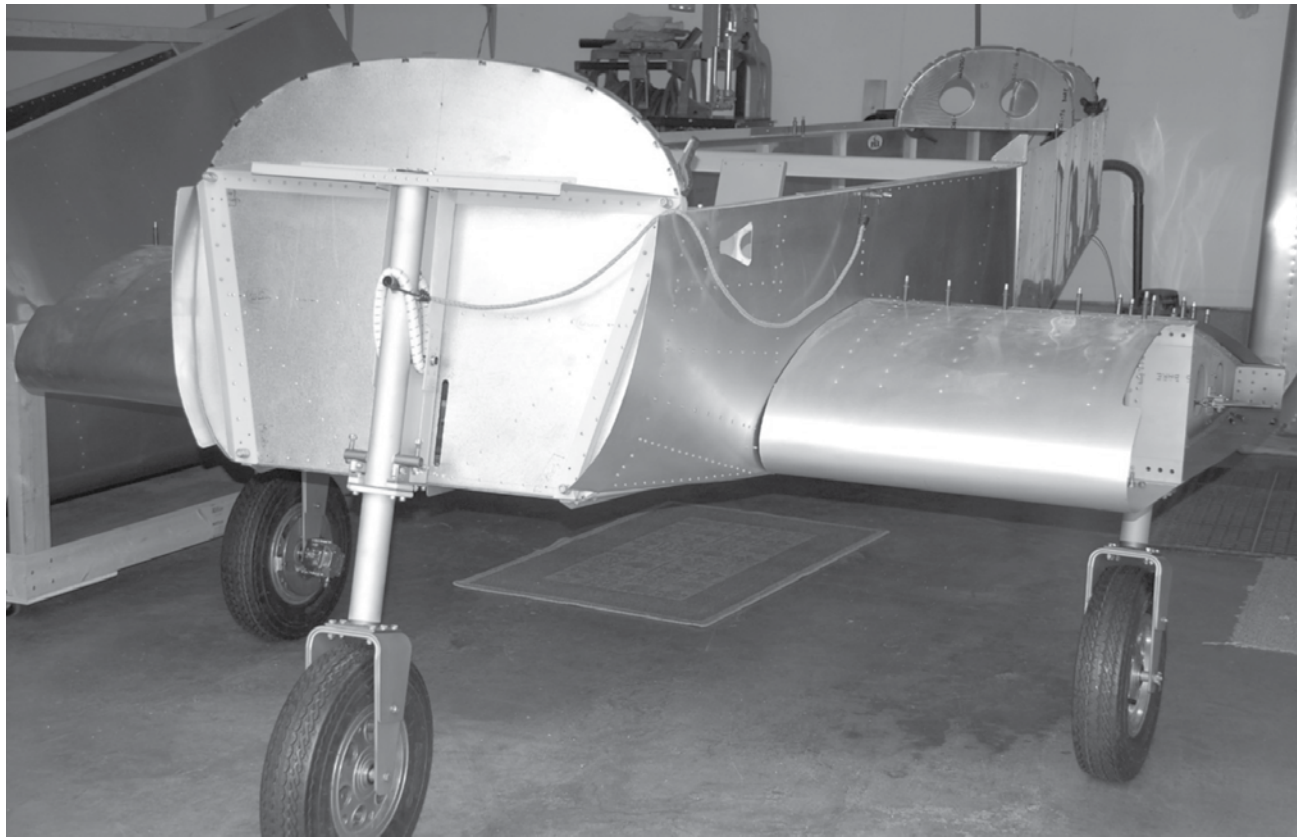
Pulling the nose skin into place was done using several ratcheting straps and lots of padding to protect the main wing skins, straps were placed adjacent to rib lines marked by clecoes.

Construction of the centre section at this stage has the top skins clecoed into place. The opening

for the cockpit where the seat and centre console will go is in the top middle, reinforcement of the outboard 2 ribs with L angles is designed to house the main gear strut and between the two rear lightening holes are the hinge brackets for the aileron bellcrank.

Wings and the centre section are connected at the splice plates and leading and trailing edge attachments have been connected to give the overall wing alignment. Black clecoes for heavier A5 rivets can be seen along the top skin in the foreground where the noses kin is yet to be riveted.





Above: On the gear! The fuselage and centre section have become one continuous part of the airframe. The fuselage top skin formers are in place and the centre section main, drilled for the wing splice bolts, can be seen at the right end of the centre section. The centre section rear spar protrudes from the right hand at the back. The completed stabilizer and bottom end of the rudder are in the far background on the right.

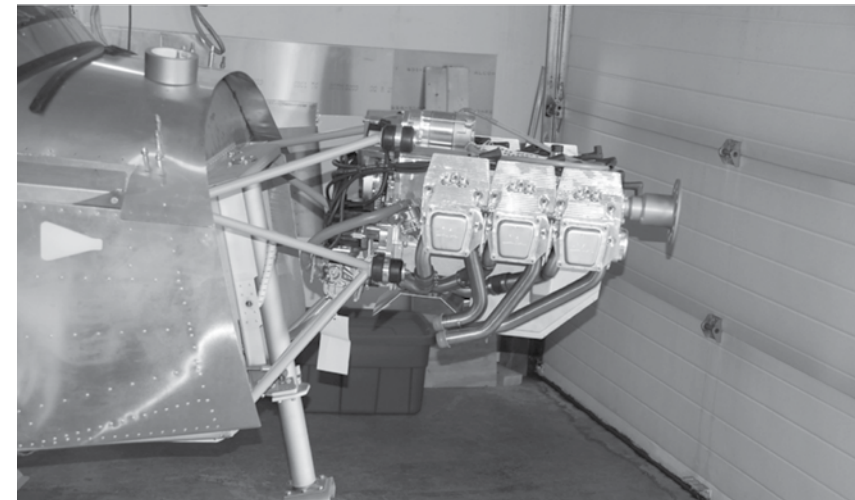
Left: The second critical fitting step was joining the fuselage to the trailing edge of the centre section. This was done with measurements taken from the top rudder

hinge pin location at the rear of the fuselage to the top outboard end of the centre section main spar. Once everything was aligned within + or - 2mm, the fuselage bottom skin, which overlaps the centre section bottom rear skin was drilled and riveted to the centre section

Lower left: The fuselage has been aligned with the centre section and attached at the bottom edge of the rear spar. Fuselage top longerons extend forward and connect to the firewall to give the correct angle to the firewall. Cockpit side panels were fitted next to enclose and tie the structure together.

in at 178 pounds. The engine and firewall forward package was purchased through Jabiru USA since they carried a complete firewall forward package for the Zenith 601 series aircraft. CANZAC Aviation at Kitchener-Waterloo airport provided many tips and much useful advice when selecting and installing the engine. During later runup tests and the first test flight, it was decided to replace the fixed pitch (49") wood propeller from Sensenich, with a 2-bladed composite ground adjustable propeller, also from Sensenich. The flexibility with pitch adjustment is worth every penny.

With the airframe completed, engine on and only instruments and wiring left to do, a change in jobs came along. This entailed a move



Left: Trial fitting of the Jabiru 3300 engine. Installation manuals from Jabiru USA for the Zenith 601 were excellent and made for an interesting and enjoyable job, especially for a non-engine person.

Below, Weight and balance with members from RAA Chapter 85, the digital scales. Bruce and Rob Prior are busy discussing the readings from the three scales.

**...THIS AGAIN
REINFORCED THE
TIME AND PLANNING
LAW THAT ANYTHING
YOU DO IS GOING TO
TAKE 5 TIMES LONGER
THAN YOU THINK.**

from Sudbury, Ontario to Vancouver, BC. The project went into the back end of the moving van and was secured and padded with the wings above it. It was unloaded at Pitt Meadows without a scratch and was temporarily placed in the large hangar at Pacific Rim Aviation until longer term hangar space was arranged.

At Pitt Meadows, the full airframe was assembled and instruments were purchased and installed. This again reinforced the time and planning law that anything you do is going to take 5 times longer than you think. In June of 2012, with the

help of RAA Chapter 85 members and the digital aircraft scales, the weight and balance was completed. This gave an empty weight of 695lbs for a design with a maximum gross weight of 1,200lbs.

In preparation for the final inspection by MDRA, fuel flow tests were run with the tail firmly placed on the ground to give the required nose high attitude. A compass swing was carried out at the Pitt Meadows compass rose and all was set for the final inspection which was done in November, 2012.

TEST FLIGHTS The final stage of





the project has been a series of test flights with Michael Pearce from MP Aviation (Boundary Bay) which led up to transitioning into the 601 HDS. The initial flight was a single circuit which showed that a coarser pitch propeller would be beneficial. I ordered a ground adjustable 2-bladed composite propeller from Sensenich and this has made a significant difference in acceleration and climb performance. Recent test flights (Fig.11) gave us cruise speeds of 95 kts at 3,000 RPM, however this also showed that some more adjustments are required on baffling in the cooling ducts.


Building the Zenith 601 HDS has been a long term project where life in general and work have to be given equal, and many times, higher priority. I knew this would be a multi-year project going into it (maybe not 14 though) and what I discovered along the way is that there is a lot of enjoyment and satisfaction in reading the plans and making a good part that is actually what it looks like in the plans. This sometimes took 2 or 3 tries, but now it is all worth it when you are in the air and start thinking about key parts. Each component of the airframe is like a smaller self-contained project, wings, rudder, fuselage etc. and these broke the full airplane into manageable bits. In addition, you learn a lot of interesting things about aircraft design and meet some very knowledgeable people along the way.

None of this would have been possible without endur-

Above: Test flight along the northern edge of the CYPK control zone. The view is to the west and shows the confluence of the Fraser River (left) and Pitt River (right)

Below, the final compass swing was done with the engine running, radios and instruments on. This had a negligible effect on the compass readings, which was reassuring.



ing support from my wife, Terry and many flying and building friends in Sudbury. The move to Vancouver and meeting members of RAA Chapter 85 has been a great impetus to help get this project finished, and to them goes a great deal of appreciation. 

Peter Whittaker is vice president of RAA Chapter 85.



Across Canada RAA Chapters in Action

RAA Chapter 85 (Vancouver)

At the September meeting we toured the facilities at Specialty Engineering on 104 Street. Andy and Tracey Pearson of Specialty Engineering had been at Mission Raceway all day and hoped that we would come by as early as possible so they could rest. We proceeded directly to their shop at 1935. Their bubbling enthusiasm and hospitality never revealed that they were tired. They were wonderful hosts.

John reported that Steve Foley, at AerSpace at Pitt Meadows Airport is now an authorized Cessna dealer in parts and airplanes. Carol Foley brought brochures to the meeting describing AerSpace services and products. AerSpace is also an agent for Aircraft Spruce.

John de Visser's latest project has been development, with the help and support of the Executive, of the RAA



Zenair's latest offering, the CH-750 Cruiser

Hangar Policy, Attachment to the Contract For Aircraft Parking Space. It is now completed and has been distributed to all RAA hangar and tie-down tenants. John explained that he wanted to establish a smarter image for the shops and hangar by making them look more like professional

hangars rather than construction and storage sites, and thereby ultimately achieving better airplane maintenance and safer airplanes.

The club is considering a project. President John displayed the spec sheets for the Zenair Cruiser CH750. He suggested it is a good example

Want to go to Space?

Scaled Composites (Burt Rutan's little aircraft/spacecraft company) flew their paying passenger spaceship for the second time on September 5th.

This spaceship, operated by Virgin Galactic, will provide sub-orbital space flights for those that have some spare money to throw around. The spaceship is currently in flight test procedures. There is some incredible flight footage on the internet—go to <http://www.virgingalactic.com> to see the most recent flight.

Absolutely fascinating.



of an airplane the Chapter could build and fly. If a team were to come forward, the Chapter would fund it. We are also looking for a Turbi replacement.

RAA London St. Thomas

On Sunday, September 8th, the Davis' hosted the London /St. Thomas RAA at their home airstrip, Brandywine Aviation. Unfortunately, not a lot of people flew in; the winds were high and gusty. Despite the conditions, many club members came out and took advantage of the Davis' hospitality. Jay had his Zenith 750 project out on display for all to see. Jay says it is ready for final inspection. This is a larger cousin of the 701 he previously built. Think of a Cessna 152 for relative size comparison. Jay has done an outstanding job on the aircraft.

At the October meeting, Dave Fisher reported the passing of long time Chapter member John Kveps and that he had a collection of material about John that he was showing in the other room of the Wing. [As an



Daryl Kings and Ed Hollestelle Examine Collision Avoidance Devices

editor's note, Dave Fisher became as a son to John after Anna's passing and John's increasing infirmity.]

As editor of Slipstream Don Hatch receives more pictures from Jack Schenck than he can use and placed them on a table in the other room. Don went on to say how much he appreciates Jack's efforts on the Chapter's behalf. This led to applause from the assembled membership. A membership list was made available for members to update their statistics Phil reported that the Sonex

wings are coming along nicely. Daryl reported that he had purchased a wood propeller from Performance Propellers who are based in Texas. The new prop will have a 24 inch pitch and a diameter of 62 inches. The one he carved himself had a 21 inch pitch and a 60 inch diameter, and when installed the Volkswagen engine over-revved. The new prop should solve that problem.

Ed Hollestelle gave a comprehensive talk about new collision avoidance technology that is available and being installed in gliders. At the present time the system being proposed by the Americans is different from the rest of the world, but hopefully a single system with common frequencies will eventually prevail and be installed in commercial and general aviation aircraft. See the picture below that shows the compact size of the units.

RAA Toronto

Membership Director Art Kitching reports 102 paid up members. Wow,

we have surpassed our goal of 100 (on to 200?). Armando Fachini has taken over a BC4 (built n '83 but mothballed) and it flew for the first time last Thursday. Armando reports a gentle stall.

Scarborough Markham

At our June meeting, we saw the feature film "Those Magnificent Men in Their Flying Machines" directed by Ken Anakin, with Stuart Whitman, Sarah Myles, James Fox, Gert Frobe, Terry Thomas and Robert Morley. It was concerned with the London to Paris Air Race at the dawn of aviation.

The Robertson family wish to thank Don's friends for their support and kindness during his illness and recent passing. The cards and donations were very heartwarming.

<http://www.SmartPilot.ca>

This is a new web site to encourage better informed pilots, developed by CASARA (Civil Air Search and Rescue Association) to enhance flight safety in Canada, with support from the National Search and Rescue

Secretariat. It supplies interesting and informative articles, videos, interactive programming, courses and tools, etc. It is free, and suitable for all levels of pilots.

RAA Winnipeg

The RAA is interested in planning courses and workshops over the winter. Some of the suggestions are fiberglassing, fabric covering, bending/riveting, and internet resources for pilots. If you are interested in any of these courses or have suggestions for other courses, please let a member of the executive know and if there is enough interest, we'll try and organize the course or workshop.

Our chapter is planning a tour to the Minot North Dakota area to see a variety of planes and projects. The plan is to depart Winnipeg on Friday November 1 and return Sunday November 3. The tour to Minot will include warbirds, rvs, and other home builds. The aviation museum at Minot apparently has aircraft that are something else to see. We are still lining up

cool projects between Winnipeg and Minot, ND but if you are interested in joining this tour, please contact Jim Oke at wmjoke@gmail.com or phone 344-5396. Spouses and friends are all welcome. If you have to work on Friday, you are welcome to join the tour at your convenience. The driving time to Minot via Grand Forks ND is just over 3 hours.

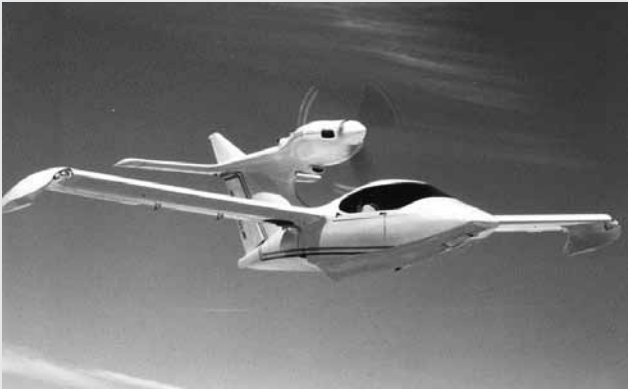
Keep Us In The Loop

Let your fellow members across the country know what your chapter is up to! Send your chapter happenings and coming events to Gregory at gregdesign@telus.net and we'll see it gets in the magazine and on the website.

Seawind Reaches Major Milestone

If you were wondering what happened to the Seawind, they have been quietly making painstakingly slow progress in their quest to certify the Seawind in Canada and the U.S. What they lacked in funding, they have made up in a resolve to succeed. Seawind has just released that it took a year of flight development to try to overcome a regulation that requires an aircraft, even if it totally loses power and enters a deep stall and then a spin, the aircraft must recover in one turn without the use of any power. Because of its amphibious design with the high mounted engine, a wind-milling propeller at zero thrust condition blocks the airflow over the rudder and makes it less than effective. The Seawind passed every other test and spent a year in flight development, trying different configurations to energize the air across the rudder. A parachute was not an option because it has to connect at the location of the

propeller. Seawind took the bold step and decided to develop a stick shaker and pusher system. If an aircraft won't stall, then you can't put it in a spin.



Exploring new ground, Seawind set out to develop the first General Aviation Stall/Spin Prevention System (SPS). After another year and half of development and testing, Seawind has successfully developed and flight tested a new SPS. The sexy sculptured Seawind will be the first single engine, Part 23, General Aviation Aircraft to have an SPS system. Add to that, Seawind will be the fastest and first all composite amphibian to be certified and that is a truly major accomplishment. Richard Silva, the driving force behind the Seawind, added "without the efforts of John Taylor, our flight analyst, and our Flight Test Team at the Canada National Research Council, and Safe Flight Instrument Corp. we would not have been successful." "We were not out to set new developmental records, but we had to rise to the occasion and find a solution. The record we are not proud of is that the Seawind is probably the longest

certification of a General Aviation Aircraft in history. The milestone ends the development and stability and control phase. We just need to make a series of performance flights to gather and record the statistical data and publish the numbers. They will be outstanding for an amphibian." "Production is poised to start and our production financing efforts are underway. We owe a lot to our fifty plus order holders and especially those who became investors in addition to ordering a Seawind. Having a full complement of plugs, molds, and assembly fixtures will speed up the production efforts. We are not done yet, but the sun is shining." For more information: <http://www.seawind.net> Contact: rsilva@seawind.net

be dismantled and subjected to non destructive testing (NDT) to check for cracks. According to Rotech the gear-box roller bearing must be replaced.

The crankshaft of a 912-914 is a pressed-together unit that is assembled in accurate fixtures to ensure correct phasing of the strokes. The shock loading of a prop strike can cause the pressed joints to slip, resulting in a twisted crankshaft. To check this, a large protractor is installed on the end of the crank, with dial indicators verifying that pairs of pistons crest TDC simultaneously, and also that the other pair is phased at 180 degrees. Rotax uses the word “must” in this part of their manual.

Transport Canada Enforcement takes a dim view of ignoring the requirements of 605.88. Recently a private individual was assessed a penalty of \$1000 for ignoring a prop strike, and in another case a corporation was assessed \$5000. The money would have been better spent on doing the inspection and replacing the necessary parts.

PILOT LICENSE BOOKLET

The first batch of the new format pilot

Is your chapter running out of new blood to keep it going? Perhaps you might consider doing something like this yourself.

license booklets will expire next year and an expired booklet mean a suspension of pilot privileges. Transport Canada recommends that a renewal application be made no less than ninety days before the expiry date. If you were one of the first batch and you wish to fly to Sun n Fun you should waste no time in filling out your application. You will need a passport photo and a guarantor to cosign.

The validity period of a booklet is five years, so have a look inside yours to see if you must do this soon. To get a form you may call your local TC office or google for Transport Canada 26-0726E. The renewal form is the same as that for the initial application.

They ask for an email address but the operative word is “should” and not “shall”, so it is desirable but not an absolute necessity.

ZENAIR 40TH ANNIVERSARY

Zenith aircraft will be celebrating their 40th anniversary next summer and they are planning a weekend of events and factory tours at their Midland Ontario facility. This will be an opportunity for owners and fans of Chris Heintz’s aircraft to meet and enjoy a weekend of education, entertainment, and camaraderie.



Turbi Repair-and-Fly Project
1967 Turbi Amateurbuilt.

Built by C.R. Goguilhot and hangared and maintained by RAA Chapter 85 for many years. Airframe 3840 TTSN, Lycoming O-235 2306 SMOH. New mags. No prop. Bendix KY97A Transceiver, Garmin GTX 320A Transponder and Sigtronics SPA-400 Intercom. All avionics are TSO'd and less than 5 years old. Recent wood prop strike and gear legs failure on takeoff. Needs new welded steel tube gear legs and repair of wood and fabric damage. Complete set of construction plans included. This is a great project for someone with some welding and wood and fabric work experience. \$5,600 or best offer. Contact Dave Rose, (604) 434-1421, dave_rose@telus.net

ICON ACQUIRES A-5
PRODUCTION TOOLING

ICON has accomplished the next major production milestone with the construction of the tools which will be responsible for manufacturing the A5's fuselage and wing skins, bringing the A5 into one of the final stages leading to serial production. This process is referred to as master tooling and is executed by our partners at Cirrus Aircraft and PCM Innovation.

The creation of these tools applies the knowledge gained from ICON'S extensive design, engineering, and aerodynamic testing process and will lead up to the assembly of the first pre-production aircraft to be completed in mid-2014. That aircraft is the first of four planes which will be used to demonstrate compliance to ASTM International standards, a process audited by the FAA in the U.S. that will ultimately provide the green light for serial production.



The completion of master tooling comes on the heels of ICON's systems integration milestone, in which every component of the A5 was locked in a virtual environment and ensured to operate systematically together. Working with a carbon fiber tooling material, the team is currently focused on ensuring the wing and fuselage tools will be ready to manufacture components which meet ICON's high standards for fit, finish, and functionality.

Keep in Touch With
Your Board of Directors!

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Interior BC/Technical Director: David King
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RAA Chapters and Meetings Across Canada

The following is a list of active RAA Chapters. New members and other interested people are encouraged to contact chapter presidents to confirm meetings as places and times may vary.

ATLANTIC REGION

HAVELOCK NB: Weekly Sunday morning get together year round, all aviation enthusiasts welcome. Havelock Flying Club - 25 mi west of Moncton. Contact Sterling Goddard 506-856-2211 sterling_goddard@hotmail.com

QUEBEC REGION

COTE NORD (BAIE COMEAU): Meeting times to be advised. Contact Pres. Gabriel Chouinard, 418-296-6180.

LES AILES FERMONTOISES (FERMONT): First Sunday 7:30 pm at 24 Ibergville, Fermont. Contact Pres. Serge Mihelic, 418-287-3340.

MONTREAL (LONGUEUIL): Chapter 415, Meeting in French second Wednesday at 8 pm, at CEGEP Edouard Montpetit 5555 Place de la Savane, St. Hubert, PQ. Contact president Normand Rioux at NRIOUX@lapresse.ca

OUATOUAIS/GATINEAU: Every Saturday 9:00 am to noon at the restaurant 19 Aileron in the airport terminal. Contact Ms N.C. Kroft, Gatineau Airport, 819-669-0164.

ASSOC DES CONSTRUCTEURS D'AVIONS EXPERIMENTAUX DE QUEBEC (QUEBEC): Third Monday 7:30 pm at Les Ailes Quebecoises, Quebec City Airport.

ASSOC AEROSPORTIVE DE RIMOUSKI: First Saturday at 9:00 am, La Cage aux Sports, Rimouski. Contact Pres. Bruno Albert, 418-735-5324.

ASSOC DES PILOTES ET CONSTRUCTEURS DU SAGUENAY-LAC ST JEAN: Third Wednesday 7:00 pm at Exact

Air, St Honore Airport, CYRC. Contact Marc Tremblay, 418-548-3660

SHERBROOKE LES FAUCHEURS de MARGUERITES. Contact Real Paquette 819-878-3998 lesfaucheurs@hotmail.com

ONTARIO

BARRIE/ORILLIA CHAPTER Fourth Saturday (and second Sat. as well) each month 9:00 am at the restaurant at Lake Simcoe Regional Airport Contact Secretary Dave Evans 705 728 8742 E-mail david.evans2@sympatico.ca

COBDEN: Third Thursday of the month at the Cobden airfield clubhouse 20:00 hrs. President - Grantley Este 613 432 0797 este@compmore.net

COLLINGWOOD AND DISTRICT: The Collingwood and District RAA, Chapter 4904, meets every first Thursday of every month, at 7:30 PM except July and August, at the Collingwood Airport or at off-site locations as projects dictate. The January meeting is a club banquet held at a local establishment. For more information contact Pres. George Elliott gelliott@sympatico.ca 705-445-7054

EXETER: Second Monday 7:30 pm at Summers-Sexsmith Airfield, Winters-Exeter Legion. Contact Pres. Ron Helm, ron.helm@sympatico.ca 519 235-2644

FLAMBOROUGH: Second Thursday 8:00 pm at Flamborough Airpark. Contact Pres. Karl Wettlaufer 905 876-2551 or lazyk-farm@sympatico.ca

KENT FLYING MACHINES: First Tuesday 7:00 pm at various locations. Contact President Paul Perry 519-351-6251 pkperry@teksavvy.com

KITCHENER-WATERLOO: Meets the third Monday of each month in the upstairs meeting room of the cadet building at CYKF, except during the summer months when we have fly-ins instead. Please contact Clare Snyder clare@snyder.on.ca

LONDON/ST. THOMAS: First Tuesday 7:30 p.m. At the Air Force Association building at the London Airport. Contact President Phil Hicks p.hicks@tvdsb.on.ca 519-452-0986

MIDLAND/HURONIA

Meeting: First Tuesday, 7:30 pm at Midland/Huron airport (CYEE) terminal building. Contacts: President Ian Reed - 705-549-0572, Secretary Ray McNally - 705-533-4998, E-mail - raa.midland@gmail.com

NIAGARA REGION: Second Monday 7:30 pm at Niagara District Airport, CARES Building. Contact Pres. Elizabeth Murphy at murphage@cogeco.ca, www.raa-niagara.ca
OSHAWA DISTRICT: Last Monday at 7:30 PM at the Oshawa Airport, South side, 420 Wing RCAF Assoc. Contact President: Jim Morrison 905 434 5638 jamesmorrison190@msn.com

OWEN SOUND Contact President Roger Foster 519-923-5183 rpfooster@bmts.com
OTTAWA/RIDEAU: Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-858-7333 bill@ncf.ca

SAUGEEN: Third Saturday for breakfast at Hanover Airport. President: Barry Tschirhart P.O. Box 1238 27 Ridout Street Walkerton, Ontario. Home: 519-881-0305 Cell: 519-881-6020. Meetings are held every second Tuesday evening, at 7:30pm. Location(s) Saugeen Municipal Airport, Kincardine or Port Elgin. All interested pilots are welcome. Email: barry.tschirhart@bell.net

YQG AMATEUR AVIATION GROUP (WINDSOR): Forth Monday, 7:30 pm Windsor Flying Club, Airport Road, Contact: Kris Browne e_kris_browne@hotmail.com

SCARBOROUGH/MARKHAM: Third Thursday 7:30 pm Buttonville Airport, Buttonville Flying Clubhouse. Contact Bob Stobie 416-497-2808 bstobie@pathcom.com
TORONTO: First Monday 7:30 pm at Hangar 41 on north end of Brampton Airport. Contact: President Fred Grootarz -

Tel: (905) 212-9333, Cell: (647) 290-9170; e-mail: fred@acronav.com

TORONTO ROTORCRAFT CLUB: Meets 3rd. Friday except July, August, December and holiday weekends at 7:30 pm Etobicoke Civic Centre, 399 The West Mall (at Burnhamthorpe), Toronto. Contact Jerry Forest, Pres. 416 244-4122 or gyro_jerry@hotmail.com.

WIARTON: Bruce Peninsula Chapter #51 breakfast meetings start at 8:30am on the second Saturday of each month in the Gallery of Early Canadian Flight/ Roof Top Cafe at Wiarton-Keppel Airport. As there are some-time changes, contact Brian Reis at 519-534-4090 or earlycanflight@symptico.ca

MANITOBA

BRANDON: Brandon Chapter RAA meets on the second Monday of each month at the Commonwealth Air Training Plan Museum at 7:30 PM except in the months of July and August. Contact Pres. John Robinson 204-728-1240.

WINNIPEG: Winnipeg Area Chapter: Third Thursday, 7:30 pm RAA Hangar, Lyncrest Airport or other location as arranged. Contact President Ben Toenders at 204-895-8779 or email raa@mts.net. No meetings June, July & Aug. RAA Winnipeg info also available at Springfield Flying Center website at <http://www.lyncrest.org/sfjraac.html>.

SASKATCHEWAN

Chapter 4901 North Saskatchewan. Meetings: Second Tuesday of the month 7:30pm Prairie Partners Aero Club Martensville, Sk. info at www.raa4901.com. Brian Caithcart is the chapter president. Contact email: president@raa4901.com.

ALBERTA

CALGARY chapter meets every 4th Monday each month with exception of holiday Mondays and July & August. Meetings from 19:00-22:00 are held at the Southern Alberta Institute of Technologies (SAIT) Training Hangar at the Calgary Airport. Join us for builder discussions, site visits, tech. tips, fly

out weekends and more. Contact president Don Rennie drennie@hemisphere-eng.com 403-874-0876

EDMONTON HOMEBUILT AIRCRAFT ASSOC: First Tuesday 7:30 pm EAHS boardroom. Contact President Bill Boyes 780-485-7088

GRANDE PRAIRIE: Third Tuesday, Chandelleville Aviation Hangar, contact Jordie Carlson at 780-538-3800 work. or 780-538-3979 evenings. Email: jcarlson@telusplanet.net

BRITISH COLUMBIA

ABBOTSFORD: Third Wednesday 7:30 pm Abbotsford Flying Club, Abbotsford Airport. Contact President, John Vlake 604-820-9088 email javlakeca@yahoo.ca

DUNCAN: Second Tuesday 7 pm members homes (rotating basis). Contact Pres. Howard Rolston, 250-246-3756.

OKANAGAN VALLEY: First Thursday of every month except July and August (no meetings) at the Mekong Restaurant. 1030 Harvey Ave. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 moneypit@uniserve.net

QUESNEL: First Monday/ Month 7:00 p.m. at Old Terminal Building, CYQZ Airport. Contact President Jerry Van Halderen 250-249-5151 email: jjvwanhalderen@shaw.ca

SUNCOAST RAA CHAPTER 580: Second Sunday 13:30 pm Sechelt Airport Clubhouse, sometimes members homes. Contact Pres. Gene Hogan, 604-886-7645

CHAPTER 85 RAA (DELTA): First Tuesday 7:30pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President: John Macready jmacready@shaw.ca. Website www.raa85.ca.
VANCOUVER ISLAND AVIATION SOCIETY (VICTORIA): Third Monday 7:30 pm Victoria Flying Club Lounge. Contact

Pres. Roger Damico, 250-744-7472.
THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President - zzA-LASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Gerry at 250-782-4707 or Heath at 250-785-4758.

Chapter executives, please advise of changes as they occur. For further information regarding chapter activities contact RAA Canada, Waterloo Airport, Breslau ON N0B 1M0 Telephone: 519-648-3030 Member's Toll Free line: 1-800-387-1028

Emails can be sent to President Gary Wolf at: garywolf@rogers.com and George Gregory at gregdesign@telus.net

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The Recreational Flyer is pleased to offer you colour advertising within the magazine. Previously limited to the back cover, we have added 4 new colour pages which will be available with limited space for your advertising needs. Our rates for both black and white and colour ads remain very competitive and you reach a captive and qualified audience. Emails can be sent to President Gary Wolf at: garywolf@rogers.com and George Gregory at gregdesign@telus.net

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Recreational Aircraft Association Canada
President: Gary Wolf / Treasurer: Wayne Hadath

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The Recreational Flyer is devoted to the aerospace sciences. The intention of the magazine is to promote education and safety through its members to the general public. Material in the Flyer is contributed by aerospace engineers, designers, builders and restorers of aviation devices and vehicles, used in an amateur capacity, as well as by other interested persons, publications and organizations. Contributions to the Recreational Flyer are voluntary and without remuneration. Opinions expressed in articles and letters do not necessarily reflect those of the Recreational Aircraft Association Canada. Accuracy of the material presented is solely the responsibility of the author or contributor. The Recreational Aircraft Association Canada does not guarantee or endorse any product offered through articles or advertising. The Flyer and its publisher welcomes constructive criticism and reports of inferior merchandise or services offered through advertising in the publication.

For Sale

FOR SALE: ZENITH CH601XL , airframe 80% complete, controls installed. Canopy mold. No landing gear. Subaru 2.2L no re-drive. \$3000 or best offer. Call 705 279 4399 or 519 351 6251



EUROPA XS MONOWHEEL with Rotax 914 turbo engine and Airmaster constant speed prop, 87 hrs total time. VFR panel with Mode C transponder, KMG GPS, Becker 720 com with intercom and headsets. This is a fast and efficient cross country aircraft with low fuel consumption. Asking \$65K, no reasonable offer refused. Contact Hazel Peregrym at 250-672-5587 snowgoose@telus.net

1960 BELLANCA CRUISEMASTER 2555 TT 260 HP IO-470F A fast aircraft with good short field performance and triple tail style.Full size nosewheel suitable for grass fields.1000 mile range. Gami injectors, engine analyser,white polyurethane paint . Otherwise stock. Have paperwork to turn it into an amateur built.
\$65,000.00 Richard 705-652-6307

ACEY DEUCY 2 seat open cockpit project. Fabric covering completed and painted. Engine Continental 0200A rebuilt with logs. New Warp Drive 3 blade ground adjustable prop. B and C Light weight starter and alternator. Full instruments and guages in rear cockpit basic flight instruments in front cockpit. Full electrics. Aluminum fuel tank. Radio included. ELT included. Gross weight 1230lbs. Estimated 50hours to final inspection. Asking \$18000. Will sell only as a package. Many extras. 905-786-2482.

FOR SALE: Advanced Flight Systems

Engine information system. Some probes, fuel flow. \$750 OBO. Chris 1-866-733-8432

STINSON 108-3, a classic aircraft for sale. Airframe 2365TT. Franklin 165 hp engine 998 TT, 82 hours since top overhaul. Fabric in 2005, float kit, wheel pants, spare engine parts, 2 metal props - seaplane and cruise. 30K OBO. 250-991-7958 Quesnel BC.

FIBERGLASS FLOATS-1500 lb+, all bulkheads installed, just ends need finishing, can be finished as amphib or straight floats- complete with aluminum streamline spreader bars, rigging tubing, fittings. 15' 2" L x 22"W at step- \$1200, pictures available.- Also MA-4 SPA carb set up for 125 HP with new float and pump plunger. Includes aluminum airbox- \$150. Bob 519-271-9575 trirmb@cyg.net. Stratford ON

BAKENG DUCE, built in 2001. Low time airframe with 180 hour O-290 D2 Lycoming. Good compression on all cylinders. Oil filter, oil separator, Cleveland main wheels, stainless exhaust. Aymar-Demuth wood prop 72 x 52. 100 mph at 2450 rpms. This is an easy flyer that is not aerobatic. Asking \$15,500 or make an offer. david.evans2@sympatico.ca. Plane is in Barrie Ontario.



CAVALIER 102.5, "Aero Sport Power" O-320-B2B; 182 TTSN. Sensenich metal prop. Airframe was totally rebuilt in 1997; 1750# GW, 622 lb useful load; VFR instruments + Garman GTX 327 TXP Mode C & Val Radio; Trutrak Turn & Bank; Kept in heated hangar; 8/10 inside and out. \$29,000 OBO. cavalier102@uniserve.com or 250-558-5551. Ask for Cameron.

ONE PAIR OF AERONCA CHAMP WINGS with a fuel tank in each. They were briefly on a Volmer Sportsman and have been recovered in Ceconite. The wings include the ailerons and cabling. \$3000. Located

in Westbank BC. 250-768-2346 dgupton@shaw.ca

O-290 G ENGINE converted to D with dual mags and O-290 cylinders. Includes starter, generator, carb, and Sensenich metal tractor prop. Rebuilt 12 hours ago, this is a very nice running engine. \$7500 OBO. 250-768-2346 dgupton@shaw.ca Westbank BC



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McCaughey metal prop, markings - DES 1 C60, DTM 7557 M1, sn# 735006 -history-unknown. Please contact JOHN SHYKULA 403-607-8539

Lycoming 0-235 C1BX 115 HP ZERO (0) HOUR SINCE (0M) OWNER MAINTENANCE 2013. 1456.1 SMOH 446.4 Stoh on tbo of 2 400 h. come with carburetor starter and mags it has flown 60.8 h. last summer 2012. Presently flyable on my PA 22-108. Also Sensenich 76 AM2-48 (74 x 48) never been repitched. Reason for sale: upgrading to 0-320A2B Price: \$7,000 OBO. Paul Gagnon 819-429-6022



“NEW” 2011 CHALLENGER LIGHT SPORT XS50, only 21 hrs. For Sale \$45,000 TTSN 21, TET 6 Built professionally by the late Rob Lake of Lake Aviation Wing tanks Brakes, Heater
Upgrades include: Rotax 582 engine installed professionally September 2012 Flip-up nose cone hinge (Aeroloite Flight) for easy access to battery, panel

wiring Custom fabric interior with pockets Hinged third door for easy entry and exit to cockpit Oil injection Strobe lights, wing tip lights from Kuntzleman Electronics upgraded Throttle assembly from light Engine Services. Avionics: BECKER CCX 175 COM/XPDR COMPAC FALCON VSI2FM-3 VERTICAL SPEED BANKINDICBALLTYPE20-20M2010-00700 Falcon Gauge Voltmeter, 6-16V, 2-1/4. Model number is VM16-2Q. AmeriKing AK-350 encoder. Avcomm AC-2EX intercom TED antenna for the transponder 11-17995 Miracle Air Whip Antenna 11-03018 for the radio additional ram mounts. Contact Bev 613 478-2923 or bevie01@ho mail.com



2006 ULTRAVIA PELICAN PL with Rotax 914 turbo 115 HP. 173 TT. Airmaster electric constant speed prop, Garmin GTX320A Mode C transponder, Icom AC200 VHF radio. Grand Rapids EIS, Lowrance 2000C GPS, Northern Airborne Technology [NAT] intercom, dual controls and brakes, electric rudder and elevator trim, plus extras. This a/c has always been hangared. Pictures and articles of Rupert’s Pelican featured in past Recreational Flyer and Kitplanes Magazines, reside on the following website, <http://www.ballardsportaircraft.com>, under the “News” pull down menu - http://www.ballardsportaircraft.com/pages/bsa_news.html. \$75000 OBO. Rupert - Kelowna BC. 250 763-9109 – rupertgruen@shaw.ca.



1974 WITTMAN TAILWIND W8, for sale because Transport does not want old pilots

flying. C-FSNY has a C-90-14F Continental with compressions 80-70-74-76. Prop is a 3 blade IVO (great prop - easy to change pitch) This plane will fly at 150 mph at 5000 ft at 75% power (measured with a GPS 4 leg measure) Uses 4 imperial gallons per hour (18.24 litres) Capacity 20 imperial gallons. Fuselage was recovered in 2012. with Ceconite. Com transceiver and 1 transponder (not working at the moment). You must have tailwheel time. I will check you out but will NOT teach you to fly. \$12,000. Jack Steele, Brockville ON 613-865-8107 jsteele@cogeco.ca



CHEROKEE PA-28-140 with 160 HP factory engine, IFR certified, 6 pack, EI engine monitor, elect tach, VOR/ILS, ADF, KT76A transponder, 2 comm radios, audio panel, Metco tips with stobes, Trutrak auto pilot with alt hold, all ADs done, outstanding condition, all oil filters saved since TOH and available for inspection (no metal ever). \$35K . more pics and specs call 519 371 4673 or email dmersich@gmail.com
WANTED: CONTINENTAL A65 PARTS: Pistons, cylinders, carb, magnetos, rocker covers, spyder, cams, etc. Also interested in complete engines up to C90. Email Chris at cphorsten@yahoo.ca or call 416-918-6569.



Rotax 582 engine firewall forward. came out of a Zenair CH 701 - ONLY 25 HOURS since rebuild . Comes with- new muffler, engine mount for ch 701 c/w float fittings, carb main jet update , radiator and mount , GAUGES AND REBUILD WORK ORDER .

Runs very well. \$ 2,500. Magnetawan Ontario, 705-349-3555

ZENAIR 750 STOL 13hrs TT Test flown, but not painted. Registered Advanced ultralight March 2013 Analog instrument panel. Ready to fly, \$98,000.00
Serious inquiries only please contact Mac at macpat@live.ca cell, 519.831.0967
JABIRU 2200 ENGINE, 200 hours since new, 80 HP. 130 lbs all in. Has updates for flywheel, oil pump diffuser plate, rocker-box lubrication, starter, have (carburetor) improved linkage. Optimized cylinder cooling baffles. Comes with everything to make it run. Mount is for Sonerai II. Engine removed in good condition to install Jabiru 3300 for better performance. Mag drop 25 rpm. Runs strong. Static take-off rpm 2900, with climb prop. Reaches 3300 rpm in cruise. Log book available. Owned and Maintained by AME. Removed and inhibited fall 2012. \$7500 or best offer. Photo is of Engine in Jabiru crate. Shipping at purchasers cost, but can take to Reimer truck terminal. Have engine stand if needed. \$50 extra plus separate shipping. Call for list of Firewall forward items included. Would keep it as a running spare but need cash for my kid's tuition. Bill Evans 514-907-4919
Wanted - someone in southern Ontario to assemble a factory kit wing set for a member's Glasair. He has asked that responses be directed to RAA Canada, so please email to garywolf@rogers.com or call 1-800-387-1028.

Hangar For Sale at Sundridge Ontario, beside CPE6 airpark. Hangar is a wood framed building with steel siding, roof, and doors, with a gravel floor. Taxes this year were \$352. Asking \$50,000. Phone 705-386-9080.

TAILWIND W-10 \$49,000 One of the best metal wing Tailwinds around. Time since new – 150 hours. Lycoming 0320 Engine, 160 HP, SMOH 650 hrs. Warnke prop. IFR, 2 King 170B, 2VOR, GS, King Transponder, 3 strobes, Leather seats, 36 US Gal. Fuel in wet wings, 3 hrs + 1 hr reserve at about 160 kts. Great cross country. Pilot,

passenger and fuel over CG, no constant retrimming. Always hangared at Brampton Airport NC3 in Ontario. Much more on my Tailwind website <earltrimble.com> or e-mail me at earltrimble@gmail.com or call 416-802-5324.



2012 RV6 35TT with slider canopy. Aerosport Power O-360 with hollow crank ready for constant speed. New Sensenich fixed pitch currently installed. TruTrak Dual EFIS and engine monitoring, connected to Garmin 696 and 2 axis autopilot with “panic button”. LED lights/strobes, HID landing light, Garmin Mode C, electronic breakers, hooker four point belts. \$82,000. Call Mike 905-520-8500 or mwiebe@bell.net


CNC3 BRAMPTON, HANGAR SPACE FOR RENT. Suitable for high wing. Heating, electricity and bi-fold door. \$335 monthly. 905-861-9535 Paul Horsten.
AVID CATALINA complete Kit #148 and Engine. Excellent Condition. Very rare! The most complete Avid Catalina kit you will find. Includes All Parts, Covering material and AN hardware. Basic instruments, ENGINE Great Plains vw 2180 kit. All metal parts factory welded and powder coated. Has ALL factory Up Grades. Complete Assembly Manuals and Assembly dvd's all factory newsletters. Always stored indoors. If interested, email for detailed information and photos. Brian Berezowski tborthobrian@tbaytel.net

GIPSY MOTH full scale replica , homebuilt project. 2/3 complete, built with many original parts. Fuselage, lower wings and ailerons, upper wings, tail plane, elevators, fin, and rudder MD-RA pre cover inspected and cleared for finishing. c/w. Gipsy engine. Price available on request. Phone continued on page 42



Women Fly / continued from page 21

based at Lyncrest Airport where we have the support of about 100 other well established pilots.

This support is critical to the success of this one-of-a-kind initiative, thank you! In the last week, C-FLUG pilots have now flown about 20 hours and soon we will have our first “Girls Only” Oil Change Work Party, where C-FLUG pilots will have an opportunity to drain the oil, cut open and inspect the oil filter, reassemble, and do a test run-up to check for leaks. Check for updated photos at www://C-FLUG.blogspot.com/ and feel free to add your welcoming comments to these new RAA-Local and RAA-Canada members. No doubt, after looking after C-FLUG for a while, some of these pilots will be looking for a plane of their own to design, build or buy. 

Josh Martin, Anne Vandenberg, Bill Vandenberg (Anne's father), Jill Oakes, and Marissa Selman with C-FLUG in her new home in the heated RAA hangar at Lyncrest Airport. Bill Vandenberg donated C-FLUG to the RAA with the understanding that it was for women to fly and if it was sold the funds would be given to the Winnipeg Foundation for the local 99s.

Below: Bill Gibson, one of the original members at Springfield Flying Club who flew to what is now Lyncrest Airport back in 1956! Bill taught Betty-Ann's Dad how to fly. Melody Hiebert, Betty-Ann McPhedran, and Karen Aitken are giving Bill the gears. **Melody. Bottom:** Karen Aitken, AME Jim Aitken's wife, helping us with the wing. Karen is taking her flight training with Harv's Air.



Jill Oakes is very active in the Lyncrest chapter of the RAA. She works at the University of Manitoba at the Centre for Earth Observation Sciences, and holds a commercial rating. She flies a plans-built AcroSport II and a Land Africa kit-built STOL aircraft.

Classifieds / continued from page 40

905-814-8391, e-mail; ken.ruetz@hotmail.com



TURBI REPAIR-AND-FLY PROJECT
1967 Turbi Amateurbuilt. Built by C.R. Goguillot and hangared and maintained by RAA Chapter 85 for many years. Airframe 3840 TTSN, Lycoming O-235 2306 SMOH. New mags.
No prop. Bendix KY97A Transceiver, Garmin GTX 320A Transponder and

Sigtronics SPA-400 Intercom. All avionics are TSO'd and less than 5 years old. Recent wood prop strike and gear legs failure on takeoff. Needs new welded steel tube gear legs and repair of wood and fabric damage. Complete set of construction plans included. This is a great project for someone with some welding and wood and fabric work experience.
\$5,600 or best offer.
Contact Dave Rose, (604) 434-1421, dave_rose@telus.net

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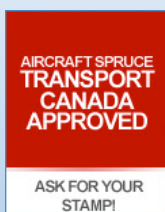


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